Uncooled High-Performance InAsSb Focal Plane Arrays, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

SVT Associates proposes an innovative digital alloy technique to extend the cutoff wavelength of InAsSb beyond 5 um, a wider band gap InAlAsSb layer inserted into depletion region to suppress dark current, and atomic layer deposition technique to coat radiation-hard material AlN on InAsSb detectors grown on GaSb substrate. This digital alloy InAsSb material system is capable of infrared detection between 0.4-5 um, depending on layer thickness of the period of each digital ultra thin superlattice. The goal of this program is to develop InAsSb-based FPA for 0.4-5 um detection at room temperature. Photo detector arrays using this material are of great interest to the NASA for various applications including, in particular, imaging and optical detection, and object discrimination when tracking targets in space or performing astronomical observations. These MWIR photo detectors can also find application to infrared-based chemical identification systems and terrestrial mapping. Applying the dark current suppression and cutoff wavelength extension process to the InAsSb-based detectors should result in higher operating temperature, extended cutoff wavelength, and radiation-hard devices, all important factors that should significantly enhance FPA operation. We intend to characterize the positive effects of proposed techniques in Phase I. In Phase II we will refine the techniques to realize high-performance MWIR FPAs operating at ambient temperatures.

Primary U.S. Work Locations and Key Partners

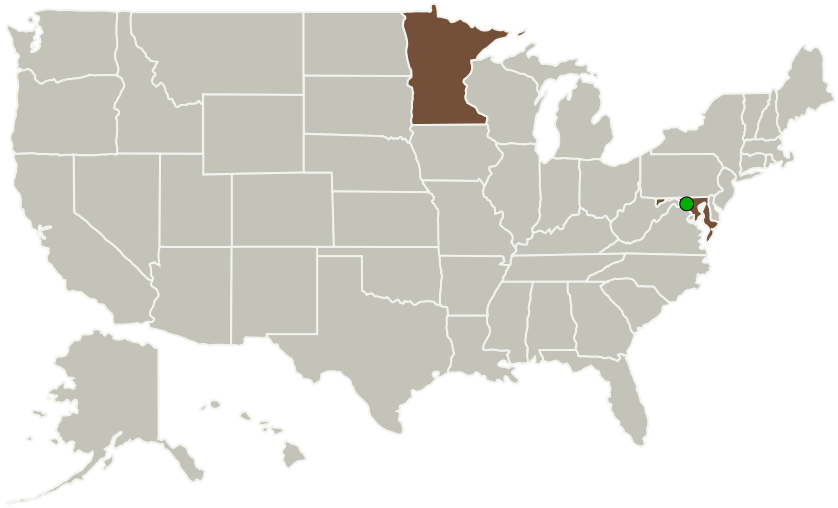

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Table of Contents

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Organizations Performing Work	Role	Type	Location
SVT Associates	Lead Organization	Industry	Eden Prairie, Minnesota
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Minnesota

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Summary: Uncooled High-Performance InAsSb Focal Plane Arrays, Phase I Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

SVT Associates

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Yiqiao Chen

Co-Investigator:

Yiqiao Chen

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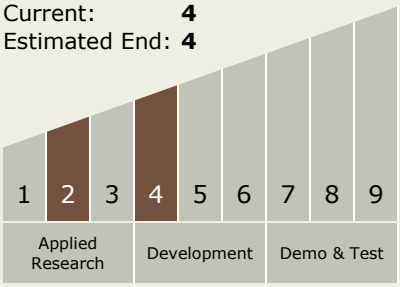
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System